CLAIMS

Claim1. An optics polarization beam splitter for separating orthogonal components of an incident optical signal using an asymmetric Mach-Zehnder interferometer, comprising:

an input optical coupler to split an incident optical signal, which has two orthogonal polarization states, into a first waveguide branch and a second waveguide branch wherein said first waveguide branch has a birefrigent section that exhibits form-birefrigence to segregate said two orthogonal polarization states; and

an output optical coupler to combine the optical signals outputted from said first waveguide branch and said second waveguide branch and to output two orthogonal output optical signals.

Claim 2. The optics polarization beam splitter as described in claim 1, wherein said optical input couplers and said optical output coupler are 3-dB couplers.

Claim3. The optics polarization beam splitter as described in claim 1, wherein said two orthogonal polarization states are transverse electric (TE) mode and transverse magnetic (TM) mode.

Claim 4. The optics beam splitter as described in claim 1, wherein said birefrigent comprises successive layers of a lower cladding, a core, a birefrigent layer, and an upper cladding.

Claim 5. The optics polarization beam splitter as described in claim 1, wherein said birefringent section of said first waveguide branch has a width narrower than a normal width of said second waveguide branch.

Claim 6.The optics polarization beam splitter as described in claim 4, further comprising a heater wrapped around said second waveguide branch below said berefrigent section.

Claim 7. The optics polarization beam splitter as described in claim 4, further comprising a heater wrapped around said birefrigent section of said first waveguide.

Claim 8. The optics polarization beam splitter as described in claim 2, wherein said input 3-dB optical coupler and said output 3-dB optical coupler are Mach-Zehnder balanced couplers.

Claim 9. The optics polarization beam splitter as described in claim 1, wherein said birefrigent section is coated with a high index of refraction layer.

Claim 10. The optics polarization beam splitter as described in claim 1, wherein said biregrigent section is coated with a birefrigent layer.

Claim 11.The optics polarizationbeam splitter as described in claim 3, wherein said core is of core material selected from the group consisting of silicon oxynitride (SiON), silicon nitride, silicon (Si),

and tantalum oxide-silica (Ta_2O_5:SiO_2) ; the lower chadding is of silica (SiO_2); and said upper chadding is of thermal oxide.

Claim12. The optics polarization beam splitter as described in claim10, wherein said core material is deposited by a process selected from the group consisting of flame hydrolysis and sputtering.; and SiON and said SiO_2 are deposited by chemical vapor deposition (CVD).

Claim 13. The optics polarization beam splitter as described in claim 1, further comprising a cascade of said beam splitter connected between said input optical coupler and said output optical coupler.

Claim 14. The optics polarization beam splitter as described in claim 7, wherein the heater is used to toggle the states of polarization at the output of said output optical coupler.

Claim 15. The optics polarization beam splitter as described in claim 13, wherein the first stage of said cascade is operated in one polarization state, and the second stage of said cascade is operated in a second polarization state.